Continuing education throughout a career in automotive body repair is required. Automotive parts, body materials, and electronics continue to change and become more complex and technologically advanced. To keep up with these technological advances, repairers must continue to gain new skills, read technical manuals, and attend seminars and classes.

An experienced automotive body repairer with supervisory ability may advance to shop supervisor. Some workers open their own body repair shops. Others become automobile damage appraisers for insurance companies.

Job Outlook

Employment of automotive body repairers is expected to increase about as fast as the average for all occupations through the year 2008. Opportunities should be best for persons with formal training in automotive body repair and mechanics.

Demand for qualified body repairers will increase, as the number of motor vehicles in operation continues to grow in line with the Nation's population. With an increase in the number of motor vehicles in use, the number of vehicles damaged in accidents will also increase. New automobile designs increasingly have body parts made of steel alloys, aluminum, and plastics—materials that are more difficult to work with than traditional steel body parts. Also, new, lighter weight automotive designs are prone to greater collision damage than older, heavier designs and, consequently, more time is consumed in repair. The need to replace experienced repairers who transfer to other occupations, retire, or stop working for other reasons will account for the majority of job openings.

The automotive repair business is not very sensitive to changes in economic conditions, and experienced body repairers are rarely laid off. However, although major body damage must be repaired, if a vehicle is to be restored to safe operating condition, repair of minor dents and crumpled fenders can often be deferred during an economic slowdown. During this time, most employers will hire few new workers. In addition, recent business conditions have forced some small, unprofitable body shops to go out of business and have led some dealerships to consolidate body shops, in order to remain viable.

Earnings

Median hourly earnings of automotive body and related repairers, including incentive pay, were $13.18 in 1998. The middle 50 percent earned between $10.23 and $17.71 an hour. The lowest 10 percent earned less than $7.38, and the highest 10 percent earned more than $22.47 an hour. Median hourly earnings in the industries employing the largest number of automotive body and related repairers in 1997 were as follows:

New and used car dealers	$14.20
Automotive repair shops	12.80
Motor vehicles, parts, and supplies	11.40

The majority of body repairers employed by automotive dealers and repair shops are paid on an incentive basis. Under this method, body repairers are paid a predetermined amount for various tasks, and earnings depend on the amount of work assigned to the repairer and how fast it is completed. Employers frequently guarantee workers a minimum weekly salary. Body repairers who work for trucking companies, bus lines, and other organizations that maintain their own vehicles usually receive an hourly wage.

Helpers and trainees usually earn from 30 to 60 percent of the earnings of skilled workers. Helpers and trainees usually receive an hourly rate, until they are skilled enough to be paid on an incentive basis.

Some automotive body repairers are members of unions, including the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters. Most body repairers who are union members work for large automobile dealers, trucking companies, and bus lines.

Related Occupations

Repairing damaged motor vehicles often involves working on mechanical components, as well as vehicle bodies. Automotive body repairers often work closely with individuals in several related occupations, including automotive and diesel mechanics and service technicians, automotive repair service estimators, painting and coating machine operators, and body customizers.

Sources of Additional Information

Additional details about work opportunities may be obtained from automotive body repair shops and motor vehicle dealers; locals of the unions previously mentioned; or local offices of your State employment service. State employment services also are a source of information about training programs.

For general information about automotive body repairer careers, write to:

☛ Automotive Service Association, Inc., 1901 Airport Freeway, Bedford, TX 76021-5732. Internet: **http://www.asashop.org**

☛ National Automobile Dealers Association, 8400 Westpark Dr., McLean, VA 22102.

☛ Inter-Industry Conference On Auto Collision Repair Education Foundation (I-CAR), 3701 Algonquin Rd., Suite 400, Rolling Meadow, IL 60008. Telephone (toll free): 1-888-722-3787.
Internet: **http://www.i-car.com/foundation.html**

For information on how to become a certified automotive body repairer, write to:

☛ ASE, 13505 Dulles Technology Dr., Herndon, VA 20171-3421. Internet: **http://www.asecert.org**

For a directory of certified automotive body repairer programs, contact:

☛ National Automotive Technician Education Foundation, 13505 Dulles Technology Dr., Herndon, VA 20171-3421.
Internet: **http://www.natef.org**

For a directory of accredited private trade and technical schools that offer training programs in automotive body repair, write to:

☛ Accrediting Commission of Career Schools and Colleges of Technology, 2101 Wilson Blvd., Suite 302, Arlington, VA 22201.

For a list of public automotive body repair training programs, contact:

☛ SkillsUSA-VICA, P. O. Box 3000, 1401 James Monroe Hwy., Leesburg, VA 22075. Telephone (toll free): 1-800-321-VICA.
Internet: **http://www.skillsusa.org**

Automotive Mechanics and Service Technicians

(O*NET 85302A and 85302B)

Significant Points

- Opportunities are expected to be very good for persons who complete formal automotive training programs.
- Automotive mechanics and service technicians must be well versed in electronics and mathematics to work on increasingly sophisticated car components and systems.

Nature of the Work

Automotive mechanics and service technicians inspect, maintain, and repair automobiles and light trucks, such as vans and pickups, with gasoline engines. Traditionally, these workers have been called "mechanics." The increasing sophistication of automotive technology now requires workers who can use computerized shop equipment and work with electronic components, while maintaining their skills with traditional handtools. Workers with these new skills are increasingly called "service technicians." (Mechanics and service technicians who work on diesel-powered trucks, buses, and equipment are discussed in the

Handbook statement on diesel mechanics and service technicians. Motorcycle mechanics—who repair and service motorcycles, motorscooters, mopeds, and occasionally small all-terrain vehicles—are discussed in the *Handbook* statement on motorcycle, boat, and small-engine mechanics.)

Anyone whose car or light truck has broken down knows the importance of the jobs of automotive service technicians. The ability to diagnose the source of the problem quickly and accurately—a most valuable skill—requires good reasoning ability and a thorough knowledge of automobiles. Many technicians consider diagnosing hard-to-find troubles one of their most challenging and satisfying duties.

When mechanical or electrical troubles occur, technicians first get a description of the symptoms from the owner or, if they work in a large shop, the repair service estimator who wrote the repair order. To locate the problem, technicians use a diagnostic approach. First, they test to see if components and systems are proper and secure, then they rule out those components or systems that could not logically be the cause of the problem. For example, if an air conditioner malfunctions, technicians' diagnostic approach can pinpoint a problem as simple as a low coolant level or as complex as a bad drivetrain connection that has shorted out the air conditioner. Technicians may have to test drive the vehicle or use a variety of testing equipment, such as on-board and hand-held diagnostic computers or compression gauges to identify the source of the problem. Once the cause of the problem is found, technicians make adjustments or repairs. If a part is damaged, worn beyond repair, or not repairable at a reasonable cost, it is replaced, usually after consultation with the vehicle's owner.

During routine service, technicians inspect and lubricate engines and other components and repair or replace parts before they cause breakdowns. Technicians usually follow a checklist to ensure they examine all important parts. Belts, hoses, plugs, brake and fuel systems, and other potentially troublesome items are among those closely watched.

Service technicians use a variety of tools in their work. They use power tools, such as pneumatic wrenches to remove bolts quickly, machine tools like lathes and grinding machines to rebuild brakes, welding and flame-cutting equipment to remove and repair exhaust systems, and jacks and hoists to lift cars and engines. They also use common handtools like screwdrivers, pliers, and wrenches to work on small parts and in hard-to-reach places.

In the most modern shops of automobile dealers, service technicians use electronic service equipment, such as infrared engine analyzers and computerized diagnostic devices. These devices diagnose problems and make precision adjustments with precise calculations downloaded from large computerized databases. The computerized systems provide automatic updates to technical manuals and unlimited access to manufacturers' service information, technical service bulletins, and other information databases, which allow technicians to keep current on trouble spots and to learn new procedures.

Automotive mechanics and service technicians use a variety of tools, such as pneumatic wrenches to remove bolts quickly.

Automotive service technicians in large shops have increasingly become specialized. For example, *automatic transmission technicians* work on gear trains, couplings, hydraulic pumps, and other parts of automatic transmissions. Extensive training and experience in electronics is needed for the complex components and technology used in new vehicles. *Tune-up technicians* adjust the ignition timing and valves, and adjust or replace spark plugs and other parts to ensure efficient engine performance. They often use electronic test equipment to locate and adjust malfunctions in fuel, ignition, and emissions control systems.

Automotive air-conditioning repairers install and repair air conditioners and service components, such as compressors, condensers, and controls. These workers require special training in Federal and State regulations, governing the handling and disposal of refrigerants. *Front-end mechanics* align and balance wheels and repair steering mechanisms and suspension systems. They frequently use special alignment equipment and wheel-balancing machines. *Brake repairers* adjust brakes, replace brake linings and pads, and make other repairs on brake systems. Some mechanics and technicians specialize in both brake and front-end work.

Automotive-radiator mechanics clean radiators with caustic solutions, locate and solder leaks, and install new radiator cores or complete replacement radiators. They also repair heaters and air-conditioners, and solder leaks in gasoline tanks.

Working Conditions

Most automotive service technicians work a standard 40-hour week, but many self-employed technicians work longer hours. To satisfy customer service needs, many service shops offer evening and weekend service. Generally, service technicians work indoors in well ventilated and lighted repair shops. However, some shops are drafty and noisy. Although some problems can be fixed with simple computerized adjustments, technicians frequently work with dirty and greasy parts, and in awkward positions. They often lift heavy parts and tools. Minor cuts, burns, and bruises are common, but serious accidents are usually avoided when the shop is kept clean and orderly and safety practices are observed.

Employment

Automotive mechanics and service technicians held about 790,000 jobs in 1998. The majority worked for retail and wholesale automotive dealers, independent automotive repair shops, or gasoline service stations. Others found employment in automotive service facilities at department, automotive, and home supply stores. A small number maintained automobile fleets for taxicab and automobile leasing companies; Federal, State, and local governments; and other organizations. Motor vehicle manufacturers employed some technicians to test, adjust, and repair cars at the end of assembly lines. About 22 percent of automotive mechanics and service technicians were self-employed.

Training, Other Qualifications, and Advancement

Automotive technology is rapidly increasing in sophistication, and most training authorities strongly recommend that persons seeking automotive mechanic and service technician jobs complete a formal training program after graduating from high school. However, some automotive mechanics and service technicians still learn the trade solely by assisting and learning from experienced workers.

Many high schools, community colleges, and public and private vocational and technical schools offer automotive service technician training programs. Postsecondary programs usually provide more thorough career preparation than high school programs. High school programs, while an asset, vary greatly in quality. Some programs offer only an introduction to automotive technology and service for the future consumer or hobbyist, whereas others aim to equip graduates with enough skills to get a job as a mechanic's helper or trainee mechanic.

Postsecondary automotive technician training programs vary greatly in format but normally provide intensive career preparation, through a

combination of classroom instruction and hands-on practice. Some trade and technical school programs provide concentrated training for 6 months to a year, depending on how many hours the student attends each week. Community college programs normally spread the training over 2 years; supplement the automotive training with instruction in English, basic mathematics, computers, and other subjects; and award an associate degree or certificate. Some students earn repair certificates and opt to leave the program to begin their career, before graduation.

The various automobile manufacturers and their participating dealers sponsor 2-year associate degree programs at postsecondary schools across the Nation. The Accrediting Commission of Career Schools and Colleges of Technology (ACCSCT) currently certifies 48 automotive technology schools and 23 diesel technology schools. Automotive manufacturers provide ASE certified instruction, service equipment, and current model cars on which students practice new skills and learn the latest automotive technology. Curriculums are updated frequently, to reflect changing technology and equipment. Students in these programs typically spend alternate 6- to 12-week periods attending classes full time and working full time in the service departments of sponsoring dealers. At these dealerships, students get practical experience, while assigned to an experienced worker who provides hands-on instruction and time saving tips. Also, some sponsoring dealers provide students with financial assistance for tuition or the purchase of tools.

The National Automotive Technicians Education Foundation (NATEF), an affiliate of the National Institute for Automotive Service Excellence (ASE), certifies automobile service technician, collision repair and refinish technician, engine machinist and medium/heavy truck technician training programs offered by high schools, postsecondary trade schools, technical institutes, and community colleges. While NATEF certification is voluntary, certification does signify that the program meets uniform standards for instructional facilities, equipment, staff credentials, and curriculum. In mid-1998, 1,208 high school and postsecondary automotive service technician training programs had been certified by NATEF, of which 965 trained automobile service technicians, 200 collision specialists, and 43 diesel and medium/heavy truck specialists.

There are more computers aboard a car today than aboard the first spaceship. A new car has from 10 to 15 on-board computers, operating everything from the engine to the radio. As a result, knowledge of electronics has grown increasingly important for automotive mechanics and service technicians. Engine controls and dashboard instruments were among the first components to use electronics; but now electronics are used in brakes, transmissions, steering systems, and a variety of other components. In the past, a specialist usually handled any problems involving electrical systems or electronics. Because electronics are now commonplace, automotive service technicians must be familiar with at least the basic principles of electronics, to recognize when an electronic malfunction may be responsible for a problem. In addition, technicians must be able to test and replace electronic components.

For trainee automotive service technician jobs, employers look for people with strong communication and analytical skills. Good reading, mathematics, and computer skills are needed to study technical manuals, to keep abreast of new technology. People who have a desire to learn new service and repair procedures and specifications are excellent candidates for trainee mechanic jobs. Trainees also must possess mechanical aptitude and knowledge of how automobiles work. Most employers regard the successful completion of a vocational training program in automotive mechanics at a postsecondary institution as the best preparation for trainee positions. Experience working on motor vehicles in the Armed Forces or as a hobby is also valuable. Because of the complexity of new vehicles, a growing number of employers require both completion of high school and additional postsecondary training. Courses in automotive repair, electronics, physics, chemistry, English, computers, and mathematics provide a good educational background for a career as an automotive service technician.

Beginners usually start as trainee technicians, mechanics' helpers, lubrication workers, or gasoline service station attendants and gradually acquire and practice their skills, by working with experienced mechanics and technicians. With a few months' experience, beginners perform many routine service tasks and make simple repairs. It usually takes 2 to 5 years of experience to acquire adequate proficiency to become a journey-level service technician to quickly perform the more difficult types of routine service and repairs. However, graduates of the best postsecondary automotive training programs are often able to earn promotion to the journey level after only a few months on the job. An additional 1 to 2 years' experience familiarizes mechanics and technicians with all types of repairs. Difficult specialties, such as transmission repair, require another year or two of training and experience. In contrast, automotive radiator mechanics and brake specialists, who do not need an all-round knowledge of automotive repair, may learn their jobs in considerably less time.

In the past, many persons have become automotive mechanics through 3- or 4-year formal apprenticeship programs. However, apprenticeships have become rare, as vocational training programs in automotive mechanics have become more common at postsecondary institutions.

At work, the most important possessions of mechanics and technicians are their handtools. Mechanics and technicians usually provide their own tools, and many experienced workers have thousands of dollars invested in them. Employers typically furnish expensive power tools, engine analyzers, and other diagnostic equipment; but hand tools are accumulated with experience.

Employers increasingly send experienced automotive service technicians to manufacturer training centers to learn to repair new models or to receive special training in the repair of components, such as electronic fuel injection or air-conditioners. Motor vehicle dealers may also send promising beginners to manufacturer-sponsored mechanic training programs. Factory representatives visit many shops to conduct short training sessions. Employers, to maintain or upgrade employee skills and increase their value to the dealership, typically furnish this additional training.

The standard credential for automotive mechanics and service technicians is voluntary certification by Automotive Service Excellence (ASE). Certification is available in one or more of eight different service areas, such as electrical systems, engine repair, brake systems, suspension and steering, and heating and air conditioning. For certification in each area, mechanics and technicians must have at least 2 years of experience and pass a written examination. Completion of an automotive mechanic program in high school, vocational or trade school, or community or junior college may be substituted for 1 year of experience. In some cases, graduates of ASE certified programs are certified in up to three specialties. To be certified as a master automotive mechanic, mechanics must be certified in all eight areas. Many dealers must have a required number of mechanics or technicians trained in each specialty. Mechanics and technicians must retake the examination at least every 5 years to maintain their certification.

Experienced technicians who have leadership ability sometimes advance to shop supervisor or service manager. Those who work well with customers may become automotive repair service estimators. Some with sufficient funds open independent repair shops.

Job Outlook

Job opportunities in this occupation are expected to be good for persons who complete automotive training programs in high school, vocational and technical schools, or community colleges. Persons whose training includes basic electronics skills should have the best opportunities. Automotive service technician careers offer an excellent opportunity for well-prepared people with a technical background, because these careers afford the opportunity for good pay and the satisfaction of highly skilled work with vehicles incorporating the latest in high technology. However, persons without formal automotive training are likely to face competition for entry-level jobs.

Employment opportunities for automotive mechanics and service technicians are expected to increase about as fast as the average for all occupations through the year 2008. Employment growth will continue to be concentrated in automobile dealerships, independent automotive repair shops, and specialty car care chains. More national

department store chains will provide auto repair services in large shops that employ many technicians to do after-warranty repairs, such as oil changes, brake repair, air conditioner service, and other minor repairs, taking less than 4 hours to complete. Employment of automotive mechanics and service technicians in gasoline service stations will continue to decline, as few stations offer repair services.

The number of automotive mechanics and service technicians will increase, due to the expansion of the driving age population and the number of households with multiple motor vehicles. The growing complexity of automotive technology necessitates that cars be serviced by skilled workers, contributing to the growth in demand for highly trained mechanics and technicians.

More job openings for automotive mechanics and service technicians are expected than for most other occupations, as experienced workers transfer to related occupations, retire, or stop working for other reasons. This large occupation needs a substantial number of entrants each year, to replace the workers who leave the occupation.

Most persons who enter the occupation can expect steady work, because changes in economic conditions have little effect on the automotive repair business. During a downturn, however, some employers may be more reluctant to hire inexperienced workers.

Earnings

Median hourly earnings of automotive mechanics and service technicians, including commission, were $13.16 in 1998. The middle 50 percent earned between $10.02 and $17.14 an hour. The lowest 10 percent earned less than $7.44 and the highest 10 percent earned more than $21.25 an hour. Median annual earnings in the industries employing the largest number of automotive mechanics and service technicians in 1997 were as follows:

Local government, except education and hospitals	$15.19
New and used car dealers	15.03
Automotive repair shops	11.86
Auto and home supply stores	11.31
Gasoline service stations	11.18

Many experienced technicians employed by automotive dealers and independent repair shops receive a commission related to the labor cost charged to the customer. Under this method, weekly earnings depend on the amount of work completed. Employers frequently guarantee commissioned mechanics and technicians a minimum weekly salary. Many master technicians earn from $70,000 to $100,000 annually.

Some automotive service technicians are members of labor unions such as the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters.

Related Occupations

Other workers who repair and service motor vehicles include diesel mechanics and service technicians, automotive body repairers, customizers, repair service estimators, and motorcycle, boat, and small-engine mechanics.

Sources of Additional Information

For more details about work opportunities, contact local automotive dealers and repair shops or the local office of the State employment service. The State employment service also may have information about training programs.

A list of certified automotive technician training programs can be obtained from:

☛ National Automotive Technicians Education Foundation, 13505 Dulles Technology Dr., Herndon, VA 20171-3421.
Internet: **http://www.natef.org**

For a directory of accredited private trade and technical schools that offer programs in automotive technician training, write:

☛ Accrediting Commission of Career Schools and Colleges of Technology, 2101 Wilson Blvd., Suite 302, Arlington, VA 22201.

For a list of public automotive technician training programs, contact:

☛ SkillsUSA-VICA, P.O. Box 3000, 1401 James Monroe Hwy., Leesburg, VA 22075. Telephone (toll free): 1-800-321-VICA.
Internet: **http://www.skillsusa.org**

Information on automobile manufacturer-sponsored 2-year associate degree programs in automotive service technology can be obtained from:

☛ Ford ASSET Program, Ford Customer Service Division, Fairlane Business Park III, 1555 Fairlane Dr., Allen Park, MI 48101. Telephone (toll free): 1-800-272-7218.

☛ Chrysler Corporation, National C.A.P. Coordinator, National Technical Training Center, 2367 Walton Blvd., Auburn Hills, MI 48326. Telephone (toll free): 1-800-626-1523.
Internet: **http://www.CAP.chryslercorp.com**

☛ General Motors Automotive Service Educational Program, National College Coordinator, General Motors Service Technology Group, MC 480-204-001, 30501 Van Dyke Ave., Warren, MI 48090. Telephone (toll free): 1-800-828-6860.

☛ Toyota-Technical Education Network (T-TEN), P.O. Box 4900, Fenton, MO 63026-9842. Telephone (toll free): 1-800-441-5141.
Internet: **http://www.t-ten.com**

Information on how to become a certified automotive service technician is available from:

☛ ASE, 13505 Dulles Technology Dr., Herndon, VA 20171-3421.
Internet: **http://www.asecert.org**

For general information about the work of automotive mechanics and service technicians, write:

☛ Automotive Service Association, Inc., 1901 Airport Freeway, Bedford, TX 76021-5732. Internet: **http://www.asashop.org**

☛ Automotive Service Industry Association, 25 Northwest Point, Elk Grove Village, IL 60007-1035

☛ National Automobile Dealers Association, 8400 Westpark Dr., McLean, VA 22102

Coin, Vending, and Amusement Machine Servicers and Repairers

(O*NET 85947)

Significant Points

- Most workers learn their skills on the job.
- Opportunities should be good for persons with some knowledge of electronics.

Nature of the Work

Coin, vending, and amusement machines are a familiar sight in offices, convenience stores, arcades, and casinos. These coin-operated machines dispense refreshments, test our senses, and spit out lottery tickets nearly everywhere we turn. Coin, vending, and amusement machine servicers and repairers install, service, and stock these machines and keep them in good working order.

Vending machine servicers, often called route drivers, visit coin-operated machines that dispense soft drinks, candy and snacks, and other items. They collect money from the machines, restock merchandise, and change labels to indicate new selections. They also keep the machines clean and appealing.

Vending machine repairers, often called mechanics or technicians, make sure machines operate correctly. When checking complicated electrical and electronic machines, such as beverage dispensers, they make sure that the machines mix drinks properly and that refrigeration and heating units work correctly. On the relatively simple gravity-operated machines, servicers check handles, springs, plungers, and merchandise chutes. They also test coin and change-making mechanisms.

When installing machines, vending machine repairers make the necessary water and electrical connections and check the machines for proper operation. They also make sure installation complies with local plumbing and electrical codes. Because many vending machines